

Name Key

Date _____

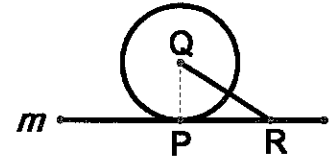
Geometry 201 Proofs for Chapter 10

(Please do the proofs on loose leaf, there is not enough room on this paper.)

In a plane, a line is tangent to a circle if and only if the line is perpendicular to a radius of the circle at its endpoint on the circle. (Discuss an indirect proof.) (Theorem 10.1)

1. Given: Line m is tangent to circle Q at P .

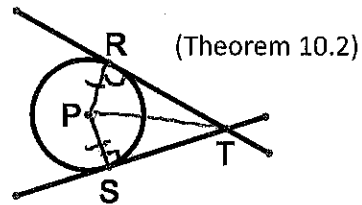
Prove: $m \perp \overline{QP}$



Tangent segments from a common external point are congruent.

2. Given: \overline{RT} and \overline{ST} are tangent to circle P .

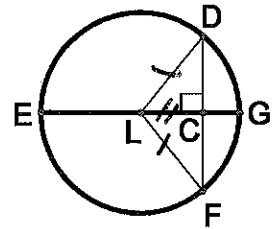
Prove: $\overline{RT} \cong \overline{ST}$



If a diameter of a circle is perpendicular to a chord, then the diameter bisects the chord and its arc. (Theorem 10.5)

3. Given: \overline{EG} is a diameter of circle L . $\overline{EG} \perp \overline{DF}$

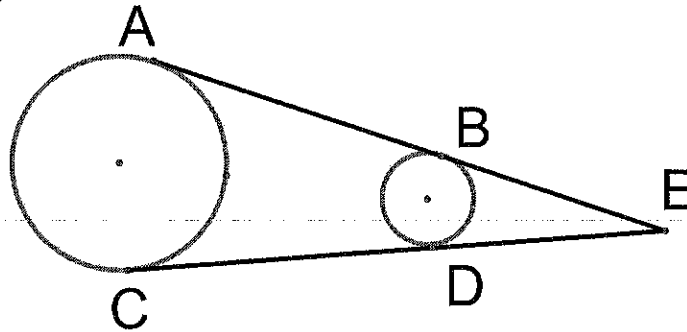
Prove: $\overline{CD} \cong \overline{CF}$, $\widehat{DG} \cong \widehat{FG}$



(You may use any theorems we have learned from this point on.)

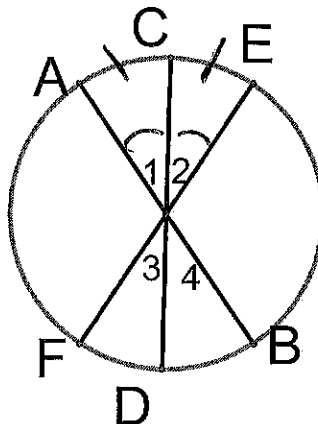
4. Given: Tangents \overline{AB} and \overline{CD}

Prove: $\overline{AB} \cong \overline{CD}$

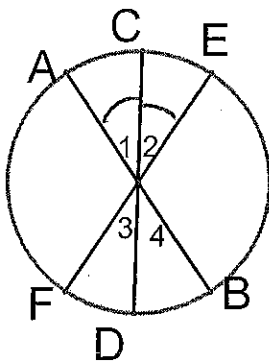


5. Given: $\widehat{AC} \cong \widehat{CE}$

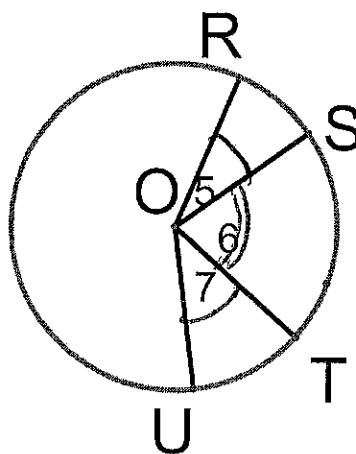
Prove: $\angle 3 \cong \angle 4$



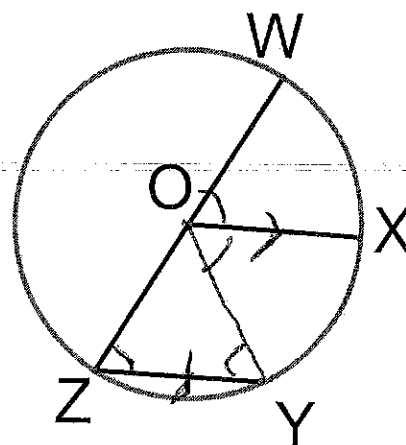
6. Given: $\angle 1 \cong \angle 2$
 Prove: $\widehat{BD} \cong \widehat{DF}$



7. Given: Circle O; $m\angle 5 = m\angle 7$
 Prove: $\widehat{RT} \cong \widehat{SU}$



8. Given: \overline{WZ} is the diameter of circle O; $\overline{OX} \parallel \overline{ZY}$
 Prove: $\widehat{WX} \cong \widehat{XY}$
 (Hint: draw \overline{OY})



201 Ch 10 Proofs 1

1. Assume $m \perp \overline{QP}$. Draw $\overline{QR} \perp m$ then $QP > QR$ b/c Rt \angle is shortest distance
 Since m intersects $\odot Q$ only at P , R must be outside of circle $\therefore QR > QP$ which contradicts earlier fact. Our assumption is false $\therefore m \perp \overline{QP}$.

2. S

- ① \sim
- ② Draw $\overline{PR}, \overline{PS}, \overline{PT}$
- ③ $\overline{RP} + \overline{SP}$ are radii
- ④ $\overline{RP} \cong \overline{SP}$
- ⑤ $\overline{PR} \perp \overline{RT}$ $\overline{PS} \perp \overline{ST}$
- ⑥ $\angle PRT + \angle PST$ are right \angle s
- ⑦ $\triangle PRT + \triangle PST$ are right \triangle s
- ⑧ $\overline{PT} \cong \overline{PT}$
- ⑨ $\triangle PRT \cong \triangle PST$
- ⑩ $\overline{RT} \cong \overline{ST}$

R

- ① Given
- ② Through any 2 points there is exactly one line
- ③ def of radii
- ④ all radii in a circle are \cong
- ⑤ Tangent \perp radius (Thm 10.1)
- ⑥ def of \perp
- ⑦ def of right \triangle
- ⑧ Reflexive
- ⑨ HL
- ⑩ CPCTC

S	R
3	
① \sim	① Given
② \overline{LD} + \overline{LF} are radii	② def of radii
③ $\overline{LD} \cong \overline{LF}$	③ All radii in a circle are \cong
④ $\angle LCD$ + $\angle LCF$ are Right \angle s	④ def of \perp
⑤ $\triangle LCD$ + $\triangle LCF$ are Right \triangle s	⑤ def of Right \triangle s
⑥ $\overline{LC} \cong \overline{LC}$	⑥ HL
⑦ $\overline{CD} \cong \overline{CF}$	⑦ CPCTC
⑧ $\angle DLC \cong \angle FLC$	⑧ CPCTC
⑨ NAME $m\angle DLC = m\angle FLC$	⑨ def of \cong
⑩ $m\widehat{DG} = m\widehat{FG}$	⑩ def of measure of minor arcs
⑪ $\widehat{DG} \cong \widehat{FG}$	⑪ def of \cong

R	R
4	
① \sim	① Given
② $\overline{AE} \cong \overline{CE}$; $\overline{BE} \cong \overline{DE}$	② Tangents from same pt are \cong
③ $AE = CE$ $BE = DE$	③ def of \cong
④ $AE = AB + BE$ $CE = CD + DE$	④ SAP
⑤ $AB + BE = CD + DE$	⑤ Subst
⑥ $AB = CD$	⑥ Subtraction
⑦ $\overline{AB} \cong \overline{CD}$	⑦ def of \cong

S	R
5. ① \sim	① Given
② $m\widehat{AC} = m\widehat{CE}$	② def of \cong
③ $m\angle 1 = m\angle 2$	③ def of measure of minor arc
④ $\angle 1 \cong \angle 2$	④ def of \cong
⑤ $\angle 1 \cong \angle 4$ $\angle 2 \cong \angle 3$	⑤ Vert $\angle s \cong$
⑥ $\angle 4 \cong \angle 3$	⑥ Subst
⑦ $\angle 3 \cong \angle 4$	⑦ Symmetric

6. S	R
① \sim	① Given
② $\angle 1 \cong \angle 4; \angle 2 \cong \angle 3$	② Vert $\angle s \cong$
③ $\angle 4 \cong \angle 3$	③ Subst
④ $m\angle 4 = m\angle 3$	④ def of \cong
⑤ $m\widehat{BD} = m\widehat{DF}$	⑤ def of measure of minor arc
⑥ $\widehat{BD} \cong \widehat{DF}$	⑥ def of \cong

S.	R.
7.	
① ~	① Given
② $m\angle G = m\angle G$	② Ref
③ $m\angle 5 + m\angle 6 = m\angle 6 + m\angle 7$	③ Add
④ $m\angle ROT = m\angle 5 + m\angle 6$ $m\angle SOU = m\angle 6 + m\angle 7$	④ AAP
⑤ $m\angle ROT = m\angle SOU$	⑤ Subst
⑥ $m\widehat{RT} = m\widehat{SU}$	⑥ def of measure of minor arc
⑦ $\widehat{RT} \cong \widehat{SU}$	⑦ def of \cong

8.

① ~	① Given
② Draw \overline{OY}	② Through any 2 pts there is exactly one line
③ $\angle WOX \cong \angle WZY$	③ Corr \angle s post
④ $\overline{OZ} + \overline{OY}$ are radii	④ def of radii
⑤ $\overline{OZ} \cong \overline{OY}$	⑤ all radii in a circle are \cong
⑥ $\angle WZY \cong \angle ZYO$	⑥ B.A.T
⑦ $\angle WOX \cong \angle ZYO$ $\angle ZYO \cong \angle YOX$	⑦ Alt Int \angle s thm
⑧ $\angle WOX \cong \angle YOX$	⑧ Transitive
⑨ $m\angle WOX = m\angle YOX$	⑨ def of \cong
⑩ $m\widehat{WX} = m\widehat{XY}$	⑩ def of measure of minor arc
⑪ $\widehat{WX} \cong \widehat{XY}$	⑪ def of \cong